Our Astronomical Column.

PLANETARY TEMPERATURES.—Dr. W. W. Coblentz's pioneer work on the measurement of the heat of the stars by means of the vacuum thermocouple is well known. In conjunction with Dr. Lampland of the Lowell Observatory, he has recently made similar observations of the heat radiation of the planets and the moon, and the results are published in the June and July issues of the Journal of the Franklin Institute. The substances water, quartz, glass, fluorite, and rock salt are found to be practically opaque beyond the wave-lengths 1·4μ, 4·1μ, 8μ, 12·5μ, and 23μ respectively, whilst the atmosphere itself is opaque beyond 15μ. By the use of screens made of the materials mentioned, it was therefore possible to obtain thermocouple measurements of the radiation incident in the regions 0·3μ to 1·4μ, 1·4μ to 4·1μ, 4·1μ to 8μ, 8μ to 12·5μ, and 12·5μ to 15μ. From these measures the true planetary radiation could be found by subtracting the reflected solar light (0·3μ to 1·4μ) from the total radiation, and the spectral composition of the remainder enabled the planetary temperature to be estimated.

The most interesting of the results are those referring to Venus and Mars. Observations on Venus showed that when the bright phase was a narrow crescent, the dark part emitted an intense planetary radiation (in the region 8μ to 12μ) amounting per unit area to one-tenth of the total radiation from the bright crescent. It is pointed out that this suggests either a short rotation period for the planet or a hot interior. The region near the south cusp was hotter than that near the north, but long-continued observations will be necessary to settle whether this is a seasonal effect. If it is seasonal, the possibility of determining the position of the axis of rotation is foreshadowed.

Extensive observations of Mars were made during the opposition of 1924. The dark regions were found to give an appreciably higher temperature than the bright regions. The noon-day temperature of the bright regions on the equator came out as 5° C., that of the adjacent dark regions as 20° C. At the same time the east (sunrise) limb gave −45°, the west (sunset) limb 0°. These results show a huge diurnal range of temperature for points on the equator, indicating a rare atmosphere. The temperature of the north polar region was found to be steady at about −70°, but that of the south polar region rose gradually from −68° to +10° as the summer season in the southern hemisphere advanced. The temperature of the night-side is thought to be probably below −70° C. The integrated temperature of the whole disc was −30° C. for the month of July 1924.

THE GRONINGEN ASTRONOMICAL LABORATORY.—This institution, founded by Prof. Kapteyn, is continuing its labours under the direction of Prof. P. J. Van Rhijn. Publications 36, 37, 39 have recently come to hand. No. 37 is a discussion of the systematic errors of the trigonometrical and spectroscopic parallaxes published by several observatories. It is well known that systematic differences exist in the parallaxes found at different observatories. Prof. Van Rhijn seeks to determine the true values by correlating angular proper motions with linear velocities for different groups of stars. Systematic errors in the assumed trigonometrical parallaxes necessarily enter also into the spectroscopic ones, since the curves of line-intensity are based on trigonometrical results.

Prof. Van Rhijn revises the Groningen statistical parallaxes given in publication 34, reducing them on the average by 10 per cent. Comparing them with the Victoria spectroscopic parallaxes, he finds the following corrections to the latter: Spectral types F, G, K, correction −0·005″; type M +0·004″.

Publication 36 is a study of the number of stars of each spectral class between definite limits of proper motion, visual magnitude and galactic latitude.

No. 39 is a list of 656 proper motions of faint stars deduced from Helsingfors plates. The largest two centennial motions are 129″ (mag. 10·2) and 38″ (mag. 13·1).

MULTIPLE STARS.—F. Henroteau, of the Ottawa Observatory, contributes an interesting paper to the July issue of *La Science moderne* describing some multiple stellar systems. Many of these are studied spectroscopically, and also photometrically with the photo-electric cell.

σ Scorpii consists of a Cepheid, the pulsation period of which is about 6 hours, having a companion with orbital velocity of some 35 km./sec. and period 33 days. There is a more distant companion the period of which is 12 years. The motion of the Cepheid in this large orbit causes its light variations to be alternately accelerated and delayed, owing to the change in its distance.

σ Cygni is stated to have a density $\frac{1}{3000}$ of the sun's, and a mass 10 times the sun's, while its companion has a diameter $\frac{1}{8}$ of that of the primary, and a mass 7/100 of the sun's, which if confirmed would make it the least massive body yet recognised outside the solar system. Rigel and α Cygni are suspected to have similar small companions, but the detection of such small masses by changes in the line-of-sight velocity is necessarily a very delicate matter.

Prof. Guthnick has studied the eclipses of σ Cygni photometrically, and states that they last about 3 days, their period of recurrence being 11 days.

OBSERVATIONS OF STARS OF SPECTRUM TYPE Be.—Stars of spectrum type B are hot stars, and those which show bright lines in their spectrum are of particular interest because their study will no doubt throw light not only on the conditions of their atmospheres, but may also help to interpret the spectra of new stars and unusual properties of the hydrogen atoms. In the spectra of these stars the hydrogen lines are sometimes very complex, such as was recently described in this column in the case of ϕ Persei as studied at the Norman Lockyer Observatory by Dr. W. J. S. Lockyer. The intensity of the bright hydrogen lines usually decreases from the red to the violet, and as the ordinary photographic spectrum only extends from Hβ to the ultra-violet, it might occur that while Hβ and the other lines towards the violet were not bright, the line at Hα might appear as a bright line. In fact, most of the so-called bright-line B stars have been discovered because Hβ or the other hydrogen lines towards the violet were bright.

A recent investigation by Paul W. Merrill, Milton L. Humason, and Cora G. Burwell (*Astrophysical Journal*, vol. 61, p. 389, June), has been devoted to the study of the Hα line of B stars, with the result that 90 more bright-line B stars have been discovered. Indeed the discussion brings out the fact that the objective-prism spectrograms have yielded more new bright-line stars than the number previously known within the areas observed. This great increase in the number of these stars has led the authors to inquire into their distribution in the heavens. The result of this study is to show that there is a tendency for them to fall into groups near the centre line of the Milky Way. Four of these groups occupy areas which are also rich in Wolf-Rayet stars. Further, the frequency of bright-line stars in the various spectral divisions has also been examined, and it is found that the spectrum classes Bo to B5 are strongly favoured. The communication includes numerous tables and illustrations, and is a valuable contribution to the study of bright-line stars.